Abstract for: *Special Session SPS-1*
The Galileo Mission to the Solar System
IAU General Assembly, Kyoto, Japan, August 21, 1997

Near-IR Spectroscopy of the Atmosphere of Jupiter

R.W. Carlson and K.H. Baines
Jet Propulsion Laboratory, California Institute of Technology

Th. Encrenaz, P. Drossart, M. Roos-Serote
Observatoire de Paris, Meudon

F.W. Taylor, P. Irwin, A. Weir, P. Smith, and S. Calcutt
Oxford University

The Galileo Near Infrared Mapping Spectrometer obtains spectral images in the wavelength range 0.7 to 5.2 μm with a spectral resolving power of approximately 200. This spectral range allows NIMS to sense cloud-reflected solar radiation, thermal emission from the deep atmosphere, and auroral bands from the thermosphere of Jupiter. Using 5-μm thermal emission spectroscopy, the amount of water vapor in the deep atmosphere (at approximately the 6 - 8 bar level) is found to vary by a factor greater than one hundred, with the highest water values approaching saturation for an oxygen abundance of about twice the value expected for a solar composition of oxygen. Deep atmosphere ammonia was also found to vary, with a spatial behavior different than that of water vapor. No evidence is found for a massive water cloud. The temperature of the (presumably NH_4SH) cloud which attenuates the 5-μm radiation must be 160 K or less. Using reflected solar radiation in conjunction with thermal emission, two cloud layers are found, the upper at 0.5 bars and a lower one at 1-1.3 bars. The inferred absorption properties of these clouds are consistent with ammonia crystals (the upper cloud) and ammonium hydrosulfide or ammonium sulfide particles (the lower cloud). Auroral emissions from H_3^+ indicate temperatures of 1000 K in the emitting region.